



United States Department of the Interior

FISH AND WILDLIFE SERVICE

West Virginia Field Office
694 Beverly Pike
Elkins, West Virginia 26241

March 10, 2009



FILE COPY

Mr. Clyde N. Thompson
Forest Supervisor
Monongahela National Forest
200 Sycamore Street
Elkins, West Virginia 26241

Re: Final Biological Opinion, Special Use Permit for Timberline Four Seasons Resort

Dear Mr. Thompson:

This document transmits the U.S. Fish and Wildlife Service's (Service's) final biological opinion (BO) on the Monongahela National Forest's (MNF) proposed renewal of the Special Use Permit (SUP) for Timberline Four Seasons Resort (Timberline) located near Dolly Sods in Tucker County, West Virginia. This BO has been developed in accordance with section 7 of the Endangered Species Act of 1973, as amended (ESA) (16 U.S.C. 1531 et seq.) and evaluates the project's effects on the federally threatened Cheat Mountain salamander (CMS) (*Plethodon nettingi*). This final BO is based on information provided in the biological assessment (BA), discussions between our respective offices, and other sources of information.

CONSULTATION HISTORY

A detailed project history starting from 1985, when the MNF was first approached regarding the potential construction of the ski slope on a portion of their property, through 2006 is provided in the February, 2008 BA and is incorporated here by reference. Additional recent key events are outlined in Table 1 below. The Service, the MNF, Timberline, and species experts have routinely communicated informally throughout this consultation process.

Table 1: Consultation History for the Proposed Action: 2006 through Present.

May 15, 2006	Letter from Dr. Tom Pauley to the MNF providing results of the 2005 CMS monitoring. The report suggests that there are continued impacts to CMS as a result of the SUP.
October 23, 2006	Letter from the Service to the MNF regarding results of 2005 monitoring and recommending that consultation be initiated prior to renewal of the SUP.
May 15, 2007	Letter from Dr. Tom Pauley to the MNF providing results of the 2006 CMS monitoring. The report suggests that there are continued impacts to CMS as a result of the SUP.
June 13, 2007	Letter from the MNF to Timberline describing issues associated with renewing the SUP, the project timeline, and need for coordination with the Service.
July 25, 2007	Letter from the MNF to Timberline reiterating need for a complete permit application so the SUP renewal process can be initiated.
November 20, 2007	Meeting with the Service, the MNF, and Timberline to discuss the project, process, and action items needed to initiate consultation.
January 3, 2008	The MNF extends Timberline's existing SUP through April 6, 2008. (Note: Errata in document lists extension date of 2007).
January 24, 2008	The MNF publishes NEPA Scoping Notice for the SUP.
February 25, 2008	Letter from the MNF to the Service providing the BA.
March 25, 2008	Meeting with the Service and the MNF to discuss project progress and additional information needed.
April 10, 2008	Meeting with the Service, the MNF and Timberline to discuss potential conservation measures.
April 15, 2008	Letter from the MNF to Timberline providing an additional extension of the SUP through October 31, 2008.
May 5, 2008	Field review with the MNF, Dr. Pauley, and the Service to determine specific locations of conservation features.
May 7, 2008	The MNF issues draft Environmental Assessment (EA) for public comment.
June 6, 2008	Letter from the Service to the MNF providing comments on the draft EA.
July 7, 2008	Meeting with the Service, the MNF, and Dr. Pauley to discuss status of project, comments on EA, and preliminary survey results.
July 25, 2008	Meeting with the Service, the MNF, and Dr. Pauley to discuss results of soil testing.
August 10, 2008	The Service receives results of CMS surveys within action area. All information required to initiate formal consultation received.
September 26, 2008	The Service provides draft BO to the MNF.
January 6, 2009	The Service receives MNF's comments on the draft BO.

BIOLOGICAL OPINION

DESCRIPTION OF THE PROPOSED ACTION

Timberline has submitted an application to re-issue their existing SUP, which expires on April 6, 2009. The MNF is proposing to authorize a new SUP for 10 years which would allow continued year round use and maintenance of the section of Salamander Run crossing MNF land; continued use and maintenance of a "connector" trail that runs from the eastern apex of the ski slope to an abandoned road (formerly FR 80); and continued use of the section of the abandoned road that runs south to the Canaan Valley National Wildlife Refuge (CVNWR) (See Figure 1).

As part of this SUP, Timberline would be authorized to use and maintain existing snowmaking infrastructure on the portion of Salamander Run located on MNF lands. Existing snowmaking infrastructure on the MNF section of Salamander Run consists of 13 electrical pedestals, 13 water hydrants, and 4 "water stick" snowmaking guns. Pedestals are connected by underground electrical wiring. Hydrants are connected by underground steel pipe. Summer and winter inspections are completed on electrical pedestals and water hydrants. Snow grooming machines are currently used on the ski slopes throughout the ski season. Snowmax ®, a snow inducing protein and the only ingredient added to the water, is used for making snow. Ski season snowmaking routinely starts in November and ends by March 15th. No motorized vehicle use occurs on the ski slope except for maintenance and administrative use. Mountain biking, hiking, and occasional horseback riding on Salamander Run generally occur from April through October, weather dependant. Timberline rents bicycles, but is not authorized to offer "guided" services for these recreational uses.

The SUP would cover the use of approximately 4100 feet of abandoned FR80 running from the connector trail south to the boundary of CVNWR. This abandoned road is no longer on the MNF's official transportation system nor has it been placed officially on the MNF's trail system. Abandoned FR80 turns into Blackbird Knob trail (TR511) approximately 200 feet to the north from the terminus of the connector trail. The connector trail is a "Y" shape with a single access from Salamander Run and two portions entering abandoned Forest Road 80 (FR80). This trail is used year round for hiking, mountain biking, cross country skiing, and horseback riding. Currently, this is a well used established trail. The trail is approximately 250 feet long by 4 feet wide, no matter which branch of the "Y" segment is used. The "trail" surface is mostly bare compacted soil with scattered leaf litter. Timberline has done minimal maintenance (installation of a water bar) on this trail however no material has been added to harden the surface.

Maintenance and replacement procedures would be addressed in the annual Operation and Maintenance (O&M) Plans, which the MNF would require as part of the SUP authorization. These procedures have not yet been developed.

The proposed action would include project specific amendments to the Forest Plan that would allow a SUP to be authorized within the habitat of a species (CMS) that is listed under the ESA when the special uses may adversely affect a population of this species or its habitat. Specifically, the project would amend Forestwide Standard TE07 as follows: "Allow authorization of a special use permit for Timberline Four Seasons Resort Management Company, Inc. to continue use and maintenance of a portion of Salamander Run, a portion of the abandoned road, and a nonsystem connector trail on National Forest System lands that may result in adverse

effects to a TEP (Threatened, Endangered, or Proposed) species (Cheat Mountain salamander) and its habitat. Measures included under this authorization decision are designed to minimize ongoing adverse effects and enhance Cheat Mountain salamander habitat over the long term. This standard applies to this specific special use authorization for Timberline Four Seasons Resort Mgt. Co. Inc. and would last only as long as the authorization is in effect. This amendment will not change the overall management direction or associated outputs and services provided in the Forest Plan.”

Forestwide standard TE59 would also be amended as follows: “Allow ground and vegetation disturbing activities to occur within occupied Cheat Mountain salamander habitat under the authorization of a special use permit for Timberline Four Seasons Resort Management Company, Inc., even though these activities may have short-term adverse effects on salamander populations or habitat. The activities (tree planting, soil sampling, fence installation, irrigation needs, and cover board placement) are designed to monitor or enhance habitat conditions for the Cheat Mountain salamander over the long term. This standard applies to this specific special use authorization for Timberline Four Seasons Resort Management Co., Inc. and would last only as long as the authorization is in effect. This amendment will not change the overall management direction or associated outputs and services provided by the Forest Plan.”

Conservation Measures

As described in BA for this project and clarified through field visits conducted on May 5, 2008, the proposed action also includes the following items specific to the known CMS population and habitat adjacent to Timberline and MNF lands, including but not limited to Salamander Run:

- CMS population monitoring will be continued annually by a biologist agreed upon by the Service and the MNF. Monitoring costs will be the responsibility of Timberline for the duration of this permit or until the Service and the MNF deem this action unnecessary. Additional habitat assessment or population inventories needed on Timberline property will be completed and associated costs would be the responsibility of Timberline.
- Timberline will purchase and plant additional spruce (i.e. native red spruce, but not Norway spruce), native hardwood tree species and provide more natural cover object materials such as limbs, logs and leaf litter throughout the wooded areas adjacent to the ski slope (identified as 2FSM and 2TLM on Figure 2). Specific numbers, sizes, and locations of trees have been determined through a Habitat Assessment provided by Dr. Tom Pauley (Pauley, 2008b). Costs for this activity will be the responsibility of Timberline.
- Timberline will install and annually maintain additional leaf fences within occupied CMS habitat adjacent to the ski slope (identified as areas 1FSM, 2FSM, 2TL, and 2TLM on Figure 2). Specific numbers, sizes, and location of fence will be determined through discussions with the Service and the MNF. Costs for this activity will be the responsibility of Timberline.
- Timberline will purchase and install cover boards throughout the wooded areas adjacent to the ski slope (identified as 2FSM and 2TLM on Figure 2). Specific numbers, sizes, and locations have been determined through a Habitat Assessment provided by Dr. Tom Pauley (Pauley, 2008b). Costs for this activity will be the responsibility of Timberline.

- Timberline will pay for the chemical analyses of soil pits to be dug on both NFS land and Timberline land (Connolly, 2008).
- Additional mitigation measures may be required, depending on the results of soil and water chemistry testing (Connolly, 2008; Edwards, 2008), and ESA consultation with the Service. At the discretion of the MNF, the MNF may assist Timberline in the purchase, planting, and installation of the items above (i.e. trees, leaf fences, cover slabs).

Action Area

The action area is defined as all areas to be affected directly or indirectly by the federal action and not merely the immediate area involved in the action. For the purposes of this BO, the action area includes all areas of potential CMS habitat on both MNF and Timberline properties that have been or could be affected by the project, and all areas covered by the SUP, including the connector trail, and FR80. The action area is shown in Figure 1 and totals approximately 151 acres.

Timberline is located on private land in Canaan Valley, in Tucker County, West Virginia. The portions of MNF land that would be covered by the authorization of the Timberline permit are located on the Potomac section of the MNF's Cheat Potomac Ranger District, MNF. Salamander Run is the most easterly ski slope at Timberline. Salamander Run is located south of the headwaters of Yokum Run and west of the boundary of Dolly Sods Wilderness area. The portion of Salamander Run within the action area consists of 9.66 acres. The ski slope is an approximately 80-foot wide, grass covered opening. The grade of the slope is approximately 12%. Elevations within the action area range from 4,268 feet on the ridge near the head of Salamander Run down to 3,800 feet where the ski slope enters Timberline property again. The ridge has an eastern aspect and the slope faces north. The prevailing winds enter from the west.

STATUS OF THE SPECIES

Listing History

The Service proposed listing the CMS as threatened under the ESA on September 28, 1988 (53 Federal Register 37814-37818). The species was formally listed as threatened on August 18, 1989 (54 Federal Register 34464-34468). In July, 1991, the Recovery Plan for the CMS was finalized.

Range and Distribution

As described in Pauley (2007), the CMS is "presently known to occur in five counties in the Allegheny Mountains of eastern West Virginia: Randolph, Pendleton, Pocahontas, Tucker, and the most western edge of Grant County along the Allegheny Front. The total range extends from Blackwater River Canyon (Tucker County) in the north, south to Thorny Flat (Pocahontas County) (approximately 58 miles) and from Cheat Mountain in the west, east to the Allegheny Front (approximately 19 miles)". Within this overall range, the CMS is restricted to a number of disjunct high elevation ridges and is only known to occur above elevations of 2000 feet in the northern part of the potential range and above 3500 in the southern part of the potential range (Pauley 2007).

Throughout the species range, approximately 80 disjunct CMS populations have been documented since 1976 (Pauley 2008a). Since that time, one of these populations and possibly

two others have been extirpated, and two have been reduced in size (Pauley 2007). It is difficult to determine CMS abundances within each of the remaining populations because standard search times were not used during searches and more than one search has been conducted at some populations (Pauley, 2008a). Therefore, determination of population size is tentatively based on area, and Pauley (2008a) defined those populations that cover greater than one acre as “large¹.” Sixty-six of the known populations fall into the large population category (Pauley 2008a).

Habitat or Ecosystem Conditions

Historically, CMS habitat consisted of red spruce (*Picea rubens*) forest with a liverwort (*Bazzania triloba*) covered floor. However, large-scale timbering and burning destroyed much of this habitat type and in many areas today the forest is composed of deciduous tree species with mosses as ground cover (Pauley 2008a). Pauley (2008a) describes “the common physical feature of *P. nettingi* habitat today appears to be the presence of either large, emergent rocks or boulder fields of small rocks...(with) stands of conifers such as red spruce and occasionally eastern hemlock (*Tsuga canadensis*) or stands of mixed deciduous forests at elevations above 610m (2000 ft) in the northern part of the known range (i.e., Spruce Knob in Pendleton County and areas north), to above 1067m (3500 ft) in the southern part of the known range (i.e., south of Spruce Knob). Pauley (2007) also found that the forest floor in CMS habitat is usually covered with the liverwort and that the habitat typically contains rock outcrops, emergent rocks, boulder fields, or narrow ravines lined with great rhododendron (*Rhododendron maximum*)”.

Vegetative structure is known to affect salamander populations. Moist old growth stands have greater abundance and species richness than dry old growth or younger stands of various moisture levels (Welsh and Lind 1988 in USDA 2008b), probably due to the complex structure of older stands and resulting amenable microclimates. Old stands provide dense litter layers, abundant woody debris, and stratified canopies, which all enhance moisture retention (Petranka et al. 1994 in USDA 2008b) and limit moisture and temperature variations in the forest floor. Because CMS are lungless, sufficient moisture must be present for respiratory exchange to occur directly through the skin (Service, 1991). As a result, CMS requires microhabitats with high relative humidity or moisture and acceptable temperatures (Feder 1983 in USDA 2008a; Feder and Pough 1975 in USDA 2008a).

Natural History

As a general rule, woodland salamanders, including the CMS, are found during the day under rocks and logs, or in rock crevices below the surface of the ground. At night, especially during rainy weather, they forage on the surface of the forest floor and occasionally climb trees or other plants for short distances (Pauley 1985 in 54 Federal Register 34464-34468; Jaeger 1978 in 54 Federal Register 34464-34468). The diet of the CMS consists mainly of mites, springtails, beetles, flies, ants, and other insects (Pauley 1980 in Service, 1991).

There are no reported observations of mating for the CMS, but as in all other woodland salamanders, fertilization is internal and complete development takes place within the egg. In contrast with most other salamanders, the CMS has no aquatic larval stage (Conant, 1975 in 54

¹ If we assume that the home range of the CMS is similar to that of the redback salamander (see Natural History section), it is estimated that one acre would provide adequate space to support the home ranges of approximately 160 female salamanders.

Federal Register 34464-34468). Mating probably occurs in late April, May or early June but there may be an abbreviated mating period in late September and early October (Pauley 2008a). In late April or early May, the CMS deposits egg masses containing 4—17 eggs and the female attends the eggs until they hatch in about three months (late August or September) (Pauley, 2008a; 54 Federal Register 34464-34468). Nests are characteristically found under rocks, logs, and bark on logs and are frequently just 2 or 3 inches deep into the soil (Pauley, 2008a).

The age at which the CMS becomes sexually mature has not been determined. However, in a similar species, the redback salamander (*P. cinereus*), males become sexually mature at age three and females at age four (Service, 1991). While the life span of CMS has not been studied, most small *Plethodon* live approximately 20 years (Service 1991). Since eggs are probably laid in alternate years, females can potentially rear eight broods (Service 1991).

While the typical size of a CMS's home range is not known, in a preliminary study, Pauley (unpubl. data) found that CMS probably did not move more than one linear meter (Service 1991). Several studies have been conducted on the home range of the redback salamander. Home range of that species in Michigan was 2.97m² for males, 24.34m² for females, and 12.87m² for juveniles (Kleeberger and Werner 1982 in Pauley, 2008a). Since CMS is of a similar size and occupies similar habitat to that species, it likely has a similar home range (Pauley, 2008a).

Threats

Historically, large-scale timbering and burning that occurred throughout the CMS range in the last 100 years resulted in significant change and loss of CMS habitat (Service 1991). Habitat modifications continue to be the primary factor affecting the habitat of the CMS today (Service, 1991; Pauley, 2007; Pauley 2008a). Habitat modifications can affect the CMS by 1) completely removing suitable habitat, 2) altering remaining habitat conditions and making the area less suitable to support the species, or 3) by fragmenting populations. Other threats to the CMS include inter-specific competition, acid precipitation, and drought.

Habitat Modifications

Activities such as clear cutting, coal mining, and development can result in the extirpation or reduction of CMS populations by removing habitat that supports the species. Five documented CMS populations have been severely impacted by surface or deep mining activities (54 Federal Register 34464-34468). Strip mine activities destroyed the population at White Top and reduced the size of the population at Barton Knob (Pauley, 2008a). Clearing and haul roads associated with mining activity also broaden the scope of the impact. (Pauley 1985 in 54 Federal Register 34464-34468) Clearcuts and forest fires most likely terminated the populations at Bald Knob and Mozark Mountain and reduced the size of the population at Thorny Flat (Pauley 2008a). Development of homes, recreational facilities, and other structures can also remove CMS habitat. For example, at least four ski resorts are in operation within the range of the CMS (54 Federal Register 34464-34468). Cutting of high-elevation forests for ski trails, lodges and condominiums is ongoing as these resorts expand (Pauley 1985 in 54 Federal Register 34464-34468).

Nearly every known population on either private or public land is impacted in some way by roads, ski slopes, timber harvesting, wildlife openings, utility rights-of-way, or gypsy moth infestations that have either removed the forest canopy or fragmented forested areas (Pauley, 2008a). These types of activities reduce the suitability of the remaining areas to CMS (Pauley, 2008a; Service 1991). Habitat fragmentation and tree removal opens the interior of the forest floor to increased amounts of sunlight and wind, resulting in an increase in soil temperature and a decrease in soil moisture and changing the microclimatic conditions on the forest floor from a mesic to zeric (Pauley, 2008a; Service 1991). Since the CMS requires moist, cool habitats, any alteration of the habitat that reduces soil moisture and/or relative humidity can lead to adverse effects such as reduced reproductive success through nest desiccation (Pauley, 2008a; Service 1991). Pauley and Watson (2003) conducted a study of the effects of habitat alterations on CMS populations. This study found that the loss of soil and litter moisture and increased soil temperatures observed at the edges of disturbances may contribute to the loss of salamanders. Few CMS were observed along the edges of disturbed areas and in general, the number of salamanders increased as the distance from the disturbance increased. In addition, juvenile salamanders were not found less than 30m from the edge of the disturbance.

These changes can also create habitat conditions that are more conducive for predators such as snakes, birds, and mammals. Typically, snake species such as gartersnakes (*Thamnophis sirtalis*), ring-necked snakes (*Diadophis punctatus edwardsii*), and red-bellied snakes (*Storeria occipitomaculata*) that prey on salamanders are less common in cool, moist forests where CMS are commonly found (Pauley, 2008a).

Disruptions of habitats may also lead to fragmentation or dissection of single large populations into smaller subunits and create barriers for dispersal and gene flow (Pauley, 2008a; Pauley and Watson 2003). The loss of genetic material in a population reduces genetic variability and could be costly to populations if diseases are introduced or other ecosystem changes should occur (Pauley, 2008a). Fragmented, smaller populations may also be more susceptible to extirpation due to natural pressures such as periods of drought and interspecific competition (Vos and Chardon 1998 in Pauley and Watson 2003; Service 1991). This is especially true if there is no possibility of recolonization from adjacent populations (Pauley and Watson 2003).

Pauley (unpubl. data in Service 1991) found that roads, and potentially some trails, serve as barriers that prevent territories of different individuals from overlapping, thus fragmenting populations and gene pools. Heavily traveled trails can result in removal of leaves and other forest litter, leaving bare trail treads (Service 1991; WVDNR 1998). CMS use forest floor litter as foraging cover and refugia (especially during the day); removal of this litter can create a barrier to these activities and render them unsuitable for territories (Service 1991; WVDNR 1998). Such barriers could also interfere with reproduction, since mating apparently occurs where territories overlap (Horne 1988 in Service 1991). However, CMS have also been documented to occur and breed within trails (Dillard & Ford, in press). Therefore, the extent to which these features serve as a barrier to CMS most likely depends on the site-specific characteristics such as width, canopy cover, substrate material, compaction, and level/type of use.

Inter-specific Competition

Preliminary behavioral laboratory experiments showed that the CMS defends its territory against other species (Pauley and Pauley, 1990 in Service 1991). Pauley and Pauley (1990) found that when a congener (the redback salamander) was introduced into its territory, the CMS was the aggressor 89% of the time, but the redback salamander won 75% of confrontations because it bit more frequently and bit the head of the CMS (Service 1991). Jaeger et al. (1982) determined that salamanders that bite the head of a competitor are the winners in confrontations (Service, 1991). Pauley and Pauley concluded that the redback salamander is probably more successful when in competition for resources such as space and food (Service, 1991).

As a result, inter-specific competition between the CMS, the redback salamander, and the mountain dusky salamander (*Desmognathus ochrophaeus*) may limit the ability of the species to retain populations within its range or re-populate areas previously occupied (54 Federal Register 34464-34468). Pauley's survey work revealed one or both of these potential competitor species were present at 83% of the sites where he found CMS, and their numbers exceeded those of CMS at half of the observed population sites. CMS populations may actually be declining where these competing species are present (54 Federal Register 34464-34468). Pauley (Pauley, 1980b in Pauley and Watson, 2003) describes a 3-way interaction among these species that influences their microdistribution. He determined that CMS and the mountain dusky salamander require more moist soil than the redback salamander and therefore compete for moist spots. CMS and the redback salamander have the same body size, consume the same primary and secondary prey items, and deposit eggs at the same time of the year and in the same nesting sites, and thus they compete for food and nesting sites. Dehydration rate studies have demonstrated that CMS loses body moisture faster than the redback salamander (Pauley, 2008a). Studies suggest that CMS is not as keen a competitor for limited resources as the other two species and that competition among these three species is probably very keen (Service, 1991). Fragmentation of forests and removal of the forest canopy creates gradients of environmental factors from the edge into the forest that may increase the natural level of interspecific competition (Pauley and Watson 2003). Smaller populations could be more susceptible to interspecific competition and competitive stress may place these populations at further risk (Pauley, 2008a).

Acid Precipitation/Deposition

Pollution factors such as acid precipitation may also affect the survival of the CMS.

The range of the CMS has been, and continues to be, the recipient of some of the highest acid (sulfate and nitrate) deposition in the nation, mainly due to its location downwind of many old coal-fired power plants that have had minimal or no pollution control required. Historically high sulfate (SO₄) deposition from sources in the Ohio River Valley has contributed to acidification of streams and could affect soil quality and productivity on parts of the MNF and other high elevation areas of West Virginia. Research scientists have found evidence of nutrient depletion occurring in certain soils on the MNF (Jenkins 2002 & Sponaugle 2005 in USDA, 2008b). The combination of high emissions and limited buffering capacity of certain geology and soil types found on the MNF, has led to increased acidity in stream water and possible nutrient depletion in soils. Over time, soils would continue to acidify naturally, but the rates of acidification are accelerated due to the continued inputs of the deposition. Forest management activities such as trail maintenance and construction, timber harvests and other types of soil disturbance could alter

this chemistry over time, too (Connolly, personal communication). Since the CMS lives directly within the soil, they are likely to be susceptible to these changes in soil chemistry. These changes in soil chemistry due to acid deposition could therefore, ultimately affect the ability of habitats to support the CMS (USDA, 2008b).

For example, acid deposition has been implicated on the build up of heavy metals in the soil and the release of aluminum into soil solutions (Ulrich et al. 1980 & Gibson and Linhurst 1982 in Wyman and Hawksley-Lescault, 1987). These factors may result in the exclusion of young or adult *Plethodons* from affected soils (Wyman and Hawksley-Lescault, 1987). In addition, while it is not known what the soil pH tolerance limits are for the CMS, it would appear that negative impacts may occur if soil pH in CMS sites decreases (Service, 1991). Wyman and Hawksley-Lescault (1987) found that the density of the redback salamander, declined when soil pH was below 3.7. In other studies, no young of the year were found on soils below 3.7, and adult survival, respiration, and growth were reduced on substrates of pH 3 and 4 (Wyman, 1988). Low soil pH has also been shown to affect sodium balance in other *Plethodon* species. Disruption of sodium balance can cause death, dehydration, and slowed growth in salamanders (Frisbie and Wyman, 1992).

Drought

Drought decreases soil moisture and thus has similar effects to those discussed under habitat modifications. Drought conditions in recent years may have had a severe and negative effect on the success of nests throughout the range (Pauley, 2008a). Nests are characteristically found under rocks (frequently just 2 or 3 inches deep into the soil), logs, and bark on logs (Pauley, 2008a). Many of these nesting sites are susceptible to desiccation during drought events.

Conservation Needs of the Species

In order to ensure that CMS populations are moving towards recovery, threats to the species must be managed and reduced by implementing the following conservation actions. First, occupied habitats must be protected by avoiding modifications that remove or degrade habitat within or adjacent to existing populations. For example, Pauley and Watson (2003) found that construction of structures and development of roads, hiking trails, utility rights-of-way, ski slopes, and other similar features that fragment habitats should not occur within 300 ft. of known CMS populations. Second, measures should be taken to offset impacts from existing habitat modifications that are adjacent to occupied habitats. This could include:

- replanting trees to restore canopy cover, especially trees such as red spruce that provide year round shade and wind buffering and are typically found in high quality CMS habitats;
- recreating ground cover and structure such as rocks, downed woody debris and leaf litter that provide cool, moist areas for shelter, nesting, and protection from predators;
- restoring natural moisture regimes by removing drainage structures, etc.; and
- restoring disturbed habitats to reduce population fragmentation and barriers by replanting trees, relocating trails/roads or providing bridges, crossings, or other structures that allow for movement, etc.

Additionally, populations need to be monitored to ensure that they remain healthy and that protection and restoration measures remain in place and are effective.

It is more difficult to implement conservation measures that address large-scale threats such as acid precipitation. However, enacting and enforcing air quality regulations that reduce the occurrence of this effect, and avoiding activities that would reduce the buffering capacity of susceptible soils may reduce the severity of this threat.

While it is not possible to control natural factors such as drought, larger populations in high quality habitat should be more able to survive these threats over the long-term. Therefore, implementing measures that maintain and enhance large blocks of high quality contiguous habitat (such as those described above) should provide population resiliency.

Finally, providing education and outreach to local landowners and other stakeholders should help ensure that they are aware of the conservation needs and status of the CMS and that they don't engage in activities that could adversely affect the species.

ENVIRONMENTAL BASELINE

This section provides an analysis of the past and ongoing human and natural factors leading to the current status of the species, its habitat and ecosystem within the action area.

Vegetation Conditions

Vegetation in the project area is influenced by the elevation, cool temperatures, and high amounts of rain and snow that are typical of the area. The vegetative conditions that dominate the Timberline area today are a product of both human induced and natural events. The forest type surrounding Timberline is characterized by a canopy and understory of scattered red spruce and yellow birch (*Betula alleghaniensis*), with beech (*Fagus grandifolia*), and red maple (*Acer rubrum*). The percentage of red spruce increases in the higher elevation areas of the action area. The forest floor adjacent to the Salamander Run ski slope is mostly open with liverwort and invading hay scented fern (*Dennstaedtia punctilobula*). The ski slope itself is open with lawn-type grass.

CMS Surveys

The area surrounding Timberline's ski lift terminus is classic CMS habitat, as described in the Status of the Species section. This typical CMS habitat continues down-slope to the north and northeast and crosses onto MNF land. There is additional CMS habitat located on Timberline property between Salamander Run and the adjacent ski slopes to the west (Pauley, 2008). Areas in the action area that have been surveyed for potential CMS presence are shown in Figure 2.

Monitoring of CMS on MNF near Timberline has occurred annually since 1986. Monitoring data is currently collected on 42 study sites located along four parallel transects in the forested area between the hairpin turn of Salamander Run (areas 1FSM and 2FSM). Two transects are located on the ridge and two are on the side-slope. Typically surveys are conducted twice a year, in May and September, depending on weather conditions. Environmental conditions, including air and soil temperature, relative humidity, soil and litter moisture, are usually collected in June,

July, and August. A total of 881 individual CMS have been documented in studies conducted in the action area through 2007. Salamander gender was recorded starting in 1990. Since then, 805 CMS have been observed including 277 males, 301 females, 124 sub-adults, and 58 juveniles (45 escaped before gender could be determined) (USDA, 2008a). Complete monitoring report results can be found in the project file.

CMS surveys were not conducted on Timberline's properties until 2008. Full results of those surveys were provided in a report (Pauley, 2008b) and are summarized here. CMS were not found in an island of forested habitat surrounded on all four sides by ski slopes (area 1TLM). CMS were found in areas to the west of the ski lift and adjacent to CVNWR and MNF properties (area 1TLa), to the north of the ski lift (area 1TLb), and areas to the north of Salamander Run immediately adjacent to MNF properties that are known to be occupied by CMS (areas 2TLM and 2TL). A total of 17 CMS were found in these areas, including both adults and juveniles. Due to the density of understory vegetation it was not possible to completely survey areas 1TLa and 1TLb, and it is expected that additional salamanders are present in these areas. Additional surveys conducted on MNF properties in 2008 documented that CMS (1 lone female, and a female and a male, with 9 eggs) were present in an area south of Salamander Run, immediately across the slope from previously known CMS populations (area 1FSa). No CMS had been found in this area during previous surveys in the 1980's. No CMS have been located within or adjacent to the connector trail during surveys conducted both in the 1980's and in 2008.

Existing Impacts

The Salamander Run ski slope was constructed some time during 1987, prior to when the CMS was listed under the ESA (1988). However, prior to construction, all parties were aware that the CMS was present within the action area and that the species was a candidate for listing. Surveys for CMS on MNF properties in the area of the proposed ski slope were first conducted in 1985. However, no surveys were conducted on Timberline's adjacent property. Prior to ski slope construction, the CMS population's boundary on the MNF was flagged and the proposed construction area was designed to allow buffer zones of approximately 45m on the ridge and at least 6m on the hillside between the proposed slope location and the edge of the salamander population, in order to avoid adverse effects to the species. As of 1985, the CMS population on the MNF was located entirely outside the original proposed location of the ski slope. In August, 1986, Dr. Pauley established 50 study sites in the known CMS habitat on MNF property adjacent to the proposed ski slope location to monitor any indirect effects the ski slope would have on the CMS population. However, actual construction of the ski slope in 1987 resulted in the destruction of 8 of the original 50 study sites located at the periphery of the population. Because the locations of the original study sites were not individually mapped, it is not possible to precisely quantify the acres of CMS habitat or number of individual CMS that were lost as a result. However, construction of Salamander Run on MNF lands impacted a total of approximately 5.7 acres of habitat. Attempts to overlay the extent of the originally mapped habitat and current location of the ski slope suggest that potentially up to 1.44 acres could have been occupied CMS habitat.

It is also difficult to quantify baseline impacts on adjacent private lands because surveys were not conducted on Timberline properties prior to construction. However, potential impacts can be

inferred from current survey results. Construction of the ski slope also resulted in the disturbance of approximately 3.96 acres on Timberline property. Because CMS are known to occur on areas immediately adjacent to the ski slope, it is likely that similar to the situation on MNF property, these areas were occupied prior to construction.

When surveys were conducted in 2008, no CMS were found in the 1.92 acre area identified as 1TLM in Figure 2. This area is completely surrounded by ski slopes and is also bisected by a small "glade" ski trail. However, occupied CMS habitat occurs immediately adjacent to the ski slopes to the north, south, and west of this area. It is likely that this area was previously occupied by CMS, but that ski slope construction created more open, dry conditions making the area unsuitable to support the species.

The areas of CMS habitat that remain in the action area and are adjacent to the ski slopes are subject to adverse effects of habitat fragmentation and tree removal. These effects are fully described in the Status of the Species section and include reductions in soil moisture and/or relative humidity leading to reduced numbers of CMS and reduced reproductive success, habitat conditions that are more conducive for predators, and increased inter-specific competition. Monitoring conducted on MNF property has confirmed that these types of effects are occurring in the action area and that CMS populations adjacent to the Salamander Run ski slope are being adversely effected. Over 23 years of monitoring, the average number of CMS found in plots in the area adjacent to the ski slope (impacted area) were less than the number found in study sites that were further away (non-impacted area). For 20 out of 23 years of data, soil and litter moisture were statistically higher in non-impacted sites when compared to impacted sites (Pauley and Watson, 2006). Throughout the entire monitoring period, only 2 gravid females and 10 juveniles/subadults have been found in the impact area. Both gravid females were found in 2006. It is estimated that these types of effects are occurring on a total of 8.2 acres, including area 2FSM (3.3 acres); 2TLM (0.90 acres); area 1TLb (2.6 acres); and portions of area 1TLa (estimated 1.4 acres). Area 1TLb has a very thick undergrowth of red spruce that may provide some buffer from the adverse effects.

Finally, the continued presence of the ski slope and the unsuitable habitat in area 1TLM has created a barrier for dispersal, and fragmented what was likely a single large population originally covering approximately 49 acres into three smaller units consisting of approximately 21 acres (areas 1FSM, 2FSM, 2TL, and 2TLM); 2.6 acres (area 1TLb); and 17.80 acres (area 1TLa). As described above, an additional 7.32 acres of CMS habitat was lost during construction. As described in the Status of the Species – Habitat Modification section, these smaller population fragments are subject to reduced gene flow and variability, and are more susceptible to extirpation due to pressures such as periods of drought, climate change, and interspecific competition.

Table 2: Summary of Baseline Effects (acres)	
<i>Direct Loss due to Ski Slope Construction</i>	
MNF property	1.44
Timberline property	5.88
Total Direct Loss	7.32
<i>Habitat Degradation</i>	
MNF property	3.3
Timberline property	4.9
Total Degradation	8.2
Total Loss & Degradation	15.52
<i>Population Fragmentation</i>	
Est. Original Population	Impacted Population
<u>1 area</u>	<u>3 areas</u>
49	21
	2.6
	17.8

Existing Forest Management Plan

Previous programmatic-level consultation between the Service and the MNF on the 2006 Land and Resource Management Plan (Forest Plan) resulted in the incorporation of various measures designed to avoid adverse effects to federally listed species, and to enhance recovery of these species in accordance with the MNF's responsibilities under section 7(a) of the ESA (Service, 2006). The existing Forest Plan (USDA, 2006) includes the following Forest-wide measures that are applicable to this project:

- Goal TE04: Within watershed-level planning units, identify TEP species habitat and opportunities to maintain, restore, or enhance habitat conditions. Design and implement management actions at the project level to address opportunities and provide for ecological conditions, population viability, reproductive needs, and habitat components for TEP species.
- Goal TE05: Collaborate on outreach programs for TEP species and their conservation needs.
- Standard TE07: Special use permits may be authorized in TEP species habitat if the uses do not adversely affect populations or habitat. This standard does not apply to Indiana bat or running buffalo clover.
- Goal TE57: Identify opportunities to reduce fragmentation of CMS populations and habitat.

- Standard TE59: Ground and vegetation-disturbing activities shall be avoided within occupied habitat and a 300-foot buffer zone around occupied (CMS) habitat, unless analysis can show that the activities would not have an adverse effect on populations or habitat.

In addition, the proposed project occurs within Management Prescription 4.1 - Spruce and Spruce-Hardwood Ecosystem Management (MP 4.1) under the existing Forest Plan. MP 4.1 emphasizes active and passive restoration of spruce and spruce-hardwood communities; and recovery of threatened and endangered species and other species of concern associated with spruce and spruce-hardwood communities. The Forest Plan describes the desired conditions within this Management Prescription as providing spruce and spruce-hardwood communities that help meet recovery plan objectives for the CMS; as well as opportunities for dispersed recreation such as hiking, mountain biking, hunting, fishing, and wildlife viewing.

EFFECTS OF THE ACTION

Renewal of Timberline's SUP as proposed would result in the continuation of the adverse effects described in the Environmental Baseline section for an additional 10 years. Continuing adverse effects would occur in the form of habitat degradation and habitat fragmentation. The potential for adverse effects may also occur from snow making activities and continued ski slope/trail maintenance and use. However, the MNF and Timberline have incorporated a number of substantial conservation measures into the project that are designed to offset the adverse effects of habitat degradation, and should reduce the level of effects below the level that is currently being experienced.

Habitat Degradation

CMS populations on a total of 8.2 acres in areas 2FSM, 2TLM, 1TLb, and the portion of area 1TLa that occurs adjacent to ski slopes, will continue to be affected by habitat degradation. The thick undergrowth of red spruce in area 1TLb may provide some buffer from the adverse effects of increased wind and reduced canopy cover described below.

The continued maintenance of an 80-foot wide grassy opening adjacent to and partially encircling areas of CMS habitat in the action area will result in decreased canopy cover, increased winds, higher air and soil temperatures, decreased soil moisture, and reduced ground cover (through a reduction in fallen leaves and woody debris from trees). It is anticipated that affected areas will have reduced numbers of CMS, reduced reproductive success, and increased inter-specific competition (See Status of the Species section). The maintenance of grassy openings adjacent to CMS habitat also provides increased access for potential CMS predators such as snakes and likely increases the number of these predators found within the area (See Status of the Species section). As an example, during soil sampling activities conducted for this project review, seven snakes were identified within the ski slope area including the smooth green snake (*Opheodrys vernalis vernalis*), the garter snake, and the ring necked snake (Connolly, 2008). Increased number of and access for predators will cause an increased mortality rate and reduction of the number of CMS within the action area.

Opening of the forest canopy to additional light has also resulted in changes in ground vegetation. The areas adjacent to the ski slopes (2TLM and 2FSM) are covered with hay-scented

fern which inhibits the growth of other plant species by preventing light from reaching the forest floor (Drew 1990 & Horsley 1993 in USDA, 2008a). An increase in fern density is also associated with decreases in herbaceous plant diversity (Rooney and Dress 1997 in USD, 2008a). Effects of fern on CMS are not known, however personal observations by Dr. Pauley over several years of study suggest that CMS are less abundant in habitats associated with fern (Pauley, personal communication). Fern rhizoids tend to fill interstitial spaces between soil particles and between the soils and cover objects. This space under woody debris is often utilized by fern rhizoids to the possible exclusion of salamanders. Changes in the ground layer plant community may also influence the invertebrate populations that CMS utilize as food sources (USDA, 2008a).

The severity of impacts experienced in the affected area has reduced somewhat over time as tree size along the edge of the slope has increased. This is demonstrated by the documentation of gravid females in the impact area for the first time in 2006 (Pauley and Watson, 2007). It is possible that as tree size continues to increase, the severity of adverse effects will be further reduced. However, soil sampling in CMS habitat in area 2FSM revealed that surface soil textures are sandy, excessively well-drained, and do not hold soil water for long periods of time. They are therefore, very susceptible to being dried out when the canopy is opened or when air movement through the understory increases (Connolly, 2008). Continued presence of the open ski slopes will make CMS populations in these areas more susceptible to the adverse effects of natural drought, and reduce the resiliency of the populations.

The initial construction within and adjacent to the ski slope disturbed and mixed the surface soil layers. This type of disturbance can stimulate microbial activity and deplete the nutrient capital in the soil (Connolly, personal communication, 2008). Soil disturbances and the removal of surface soil and organic matter can exacerbate the effects of acid deposition, and could have had initial adverse effects to the CMS. As a result of continued ski slope maintenance, and the creation of grassy areas on the slope, soils within the slope itself have a higher pH level than soils on either side of the slope (areas 2FSM or 1FSa) (Connolly, 2008). Although this may seem to suggest that the continued presence of the ski slope might offset the impacts of acid deposition, surface soils (O/A horizon) within occupied CMS habitat adjacent to the ski slope were documented to have a pH of 2.9 (Connolly, 2008). Adverse effects to other *Plethodon* species have been shown to occur at pHs of below 3.7 (see Status of the Species section – Acid Deposition). Soils within the ski slope area are also now more like conditions created in managed agricultural settings (Connolly, 2008) and are not typical of those found within the red spruce forest ecosystems that the CMS is adapted to. In addition, the reduction in trees adjacent to CMS habitat has reduced the accumulation of organic matter in the form of leaves and downed woody debris that would allow the soils to recover from the original nutrient depletion. While it is not possible to precisely determine how these changes have affected the CMS, these changes in soil conditions likely have exacerbated the adverse effects to CMS populations caused by the other habitat changes in the area described above.

Habitat Fragmentation

The continued presence of the ski slopes and the unsuitable habitat in area 1TLM presents a continued barrier for CMS dispersal, and eliminates the possibility of reconnecting previously fragmented CMS populations. Although a limited number of CMS may be able to cross the ski

slope from areas 1FSM and 2FSM into in area 1FSa; or from area 1TLa to 1TLb, the proposed action will ensure that barriers to CMS migration will remain in place for an additional 10 years. Populations in the action area will continue to subsist as three small fragmented populations (as described in the Environmental Baseline section). Smaller population fragments are subject to reduced gene flow and variability, and are more susceptible to extirpation due to pressures such as periods of drought, climate change, and interspecific competition (See Status of the Species – Habitat Modification section).

Ski Slope/Trail Maintenance and Use

The ski slopes may be mowed, graded, or otherwise maintained during the non-winter periods. Mountain bikers, horseback riders, or hikers could also be present on the ski slopes at this time. The ski slope, with its lack of suitable habitat, open dry conditions, and higher density of potential predators, most likely provides a substantial barrier to CMS migration. Continued use and maintenance of the area will ensure that the area continues to be unsuitable habitat. However, it is possible that CMS may on occasion be present within the ski slope itself and/or attempt to cross the area. For example, recent surveys resulted in the discovery of a few CMS in a small area south of Salamander Run immediately across the slope from previously known CMS populations. This area is atypical CMS habitat and no CMS had been found during previous surveys in this area in the 1980's (Pauley, personal communication, 2008). It is possible that CMS were present, but not found during the previous surveys, or it is possible that over the course of 20 years, a few CMS looking to establish new territories successfully crossed the ski slope. CMS are most likely to be moving across the ski slopes during warm, wet weather in the non-winter season. Mechanized slope maintenance is less likely to occur during rainy periods, and the number of recreational users during these times is likely to be low as well. Although the potential for this is likely discountable, CMS could be inadvertently crushed by people, equipment or other vehicles traveling on the slopes during these times.

As described in the Environmental Baseline section, no CMS have been found along the connector trail during repeated surveys in the area. Therefore, no adverse effects from use of the connector trail are currently anticipated. Renewal of the SUP will result in the continued use of the connector trail for the next 10 years at a higher level than if the SUP was not renewed. The result is that the soils along this trail will continue to be compacted and widened, and will be unsuitable to support the species. However, it is possible that over time, a few CMS looking to establish new territories may successfully cross the ski slope into the area around the connector trail. If this happens, CMS could be directly crushed by mountain bikers, horseback riders, or other visitors using the trail. However, due to the low likelihood and number of CMS potentially present on the trail itself, and the occasional and intermittent use of the trail, the probability that this will occur is discountable.

Snomax®

Timberline currently uses the additive Snomax® when making snow. Snomax® includes a sterile, mutated form of the ice nucleating bacterium *Pseudomonas syringae* (Wallis et al. 1988 in USDA, 2008a). The additive is used for snowmaking from November to March, and data suggests that the ice-nucleating activity of Snomax® may persist as long as two months (Wallis et al. 1988 & Goodnow et al. 1990 in USDA, 2008a). There is little data to suggest that CMS may be directly affected by this additive (USDA, 2008a). CMS are not likely to be present on

the surface during the time that snow making is occurring. There is a possibility that CMS may be exposed to Snomax® within their hibernacula by leaching of Snomax® laden water, but a comparison of the results of soil tests conducted on the slope and within CMS habitat suggests that artificially manufactured snow is not typically reaching occupied CMS habitat (Connolly, personal communication, 2008). Further, Snomax® does not appear to change the chemistry of water being applied to the area, as the results of water testing at the pond (where water is extracted), immediately after mixing Snomax®, and at the discharge point for snowmaking, showed no substantial differences in pH, or levels of calcium, magnesium, sodium, or potassium (Edwards, 2008). Indirect effects of Snomax® could result from impacts to CMS prey species, or plant species upon which CMS prey species depend. The ice-nucleating protein of Snomax® has been shown to cause mortalities within at least four insect orders (Coleoptera, Hemiptera, Hymenoptera and Lepidoptera). Assuming that the bacterium utilized in Snomax® would have the same effects on ants, beetles, and other CMS prey species on and near areas treated at Timberline, there is a possibility Snomax® application could decrease prey abundance for the CMS. A more complete review of the potential effects of this additive is contained in the BA, and is incorporated here by reference.

Effects of the Proposed Conservation Measures

The MNF and Timberline have incorporated a number of conservation measures into the project that should reduce the severity of the anticipated adverse effects as described above, and are consistent with the conservation needs of the species as described in the Status of the Species section.

Approximately 200 red spruce seedlings have been planted along the edge of the ski slope in areas 2TLM and 2FSM. The placement of trees along the edge of the slope will eventually create shade that will cool the area; produce additional fallen leaves and woody debris that provide cover and nutrients; and provide a windbreak helping to keep the ground from drying out as quickly. Trees were strategically placed to shade edges of the population to prevent direct ground drying.

Approximately 1200 cover boards were placed within the affected areas of 2FSM and 2TLM. Habitat in these areas does not contain large amounts of woody debris that would provide surface cover. Because the speed of natural woody debris recruitment is variable, adding cover boards from native species will provide additional area for CMS to forage, find refuge, and hibernate. They will also provide cool, shaded areas to help protect the CMS during dry periods. Cover boards were created from the same tree species found in the area. Hemlock, walnut, and locust species were not be used as these trees contain toxins which could negatively affect CMS.

To increase litter density, a fence designed to catch leaves will be placed within CMS occupied habitat in areas FSM, 1FSM, 2TLM, and or 2TL. Placement of the fence may not necessarily occur within all these areas but will be designed to maximize retention of leaf litter throughout occupied CMS habitat. Leaf litter serves as a refugium and shelter for CMS, protecting them from predators and desiccation. Hatchlings spend their first year or two in litter instead of seeking refuge under logs and rocks. For a population of CMS to remain healthy, there must be a rich layer of leaf litter. Due to the increased winds and reduced number of trees in the area, leaf litter is not accumulating in the area at a rate to sustain healthy populations. The fence will

be of a material and construction so that leaves being dropped or blown into the area will be caught and retained in the area by the fence. In winter, this fence may also serve as a snow brake, catching and holding snow which will slowly melt, hydrating the soil.

The combined effect of these three conservation measures is that the adverse effects currently experienced within areas 2FSM and 2TLM (a total of 4.2 acres) will be reduced below those currently experienced. Overtime, as the planted trees mature, the effectiveness of the proposed conservation measures is expected to increase.

The MNF and Timberline conducted a delineation of CMS populations within the action area. This allowed for a more complete understanding of the extent and health of the population. They further propose to conduct annual population monitoring of CMS within occupied CMS habitat on MNF properties. This conservation measure will allow the parties to assess the severity of the adverse effects that are occurring, the effectiveness of the proposed conservation measures, and the continuing overall health of the CMS population. The results of monitoring may be used to determine whether additional conservation actions should be undertaken, or if sufficient recovery of CMS habitat conditions has occurred so that continued implementation of selected conservation measures is no longer necessary.

Summary

Renewal of the proposed SUP will result in continued adverse effects to the CMS for an additional 10 years. These effects include degradation of CMS habitats through changes in the forest canopy and on the forest floor; increased interspecific competition and access for predators; reduced levels of cover, leaf litter, and soil moisture; and potentially in reduced soil pH and nutrient availability. These effects are expected to decrease CMS numbers and reproduction in the affected areas. CMS populations in the action area will remain fragmented, have reduced gene flow, and be more susceptible to extirpation. Continued maintenance and use of the ski slope and trails in the action area will ensure that barriers to CMS migration remain. There is a discountable potential that these maintenance activities could result in direct crushing of individual CMS. The use of Snowmax® for snow making is not expected to have any direct effects on the CMS, but there is a possibility Snomax® application could decrease prey abundance for the CMS. The MNF and Timberline have incorporated a number of conservation measures, including the planting of trees, and the placement of cover boards and leaf fences, into the proposed project. These conservation measures are expected to offset the adverse effects of habitat degradation that are occurring on 4.2 acres of habitat, and will reduce these adverse effects below the level that is currently occurring. Monitoring of the CMS population in the action area will allow the parties to assess the effectiveness of the proposed conservation measures, and the continuing overall health of the CMS population.

CUMULATIVE EFFECTS

Cumulative effects include the combined effects of any future state, local, or private actions that are reasonably certain to occur within the action area covered in this BO. Future federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the ESA.

No cumulative effects are anticipated to occur that are above or beyond the effects already described above. Recreational uses such as skiing, hiking, biking, and horseback riding occur on both public and private lands in the action area. The effects of these actions on CMS and its habitat in the action area have already been fully considered above. The Service is not aware of any plans to expand or construct additional recreational facilities within private lands in the action area. Any additional projects undertaken on Federal lands would be subject to a separate section 7 review, and are therefore not considered cumulative effects.

CONCLUSION

After reviewing the current status of CMS, the environmental baseline, the effects of the proposed action and the cumulative effects, it is the Service's biological opinion that implementing the MNF's proposed activities as proposed, is not likely to jeopardize the continued existence of the CMS. Critical habitat has not been designated for this species, therefore none will be affected by this action.

Approximately 80 disjunct CMS populations have been documented throughout the species range since 1976 (Pauley 2008a). Since that time, it is known that one of these populations and possibly two others have been extirpated. Almost all the known populations have been affected by some extent by habitat degradation or fragmentation. It is estimated that sixty-six of the remaining populations cover greater than one acre of habitat. The proposed project would authorize continuing adverse effects within one of these 66 populations. Anticipated adverse effects include habitat degradation that will continue to reduce the numbers and reproduction of CMS present within the action area; and the continued fragmentation of the population into three smaller sub-populations. These smaller sub-populations will have reduced gene flow and be more susceptible to extirpation due to events such as drought or fire. However, the proposed action alone is not expected to extirpate this population during the life of the SUP, as evidenced by their continued presence in the action area over 20 years of monitoring. In addition, the implementation of the proposed conservation measures is expected to reduce the current level of effects over time.

INCIDENTAL TAKE STATEMENT

Section 9 of the ESA and federal regulation pursuant to section 4(d) of the Act, prohibit the take of endangered and threatened species, respectively, without special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or attempt to engage in any such conduct. Harm is further defined by the Service to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing behavioral patterns, including breeding, feeding, or sheltering. Harass is defined by the Service as intentional or negligent actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavioral patterns which include, but are not limited to, breeding, feeding or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the Act provided that such taking is in compliance with the terms and conditions of this Incidental Take Statement.

The measures described below are non-discretionary, and must be undertaken by the MNF and any applicant or agent, as appropriate, for the exemption of section 7(o)(2) to apply. The MNF has a continuing duty to regulate the activity covered by this Incidental Take Statement. If the MNF should (1) fail to assume and implement the terms and conditions, or (2) fail to require an applicant to adhere to the terms and conditions of the Incidental Take Statement through enforceable terms that are added to any permit or grant document, the protective coverage of section 7(o)(2) may lapse. In order to monitor the impact of incidental take, the MNF must report the progress of the action and its impact on the species to the Service as specified in the Incidental Take Statement [50 CFR 402.14(i)(3)].

Level of Take²

The Service anticipates that incidental take of CMS will occur as a result of habitat degradation and fragmentation; and the potential unquantifiable loss of prey availability through the use of Snowmax®. There will be continued reduced numbers and reproduction of CMS in the action area. It would be difficult to estimate the number of individual CMS that may be affected over the life of the project. Since 1986, 881 individual CMS have been observed on MNF properties being monitored in association with the SUP. An undetermined number of CMS eggs and nests have also been found throughout that monitoring period. An additional 20 CMS and one nest containing 9 eggs have been found in other areas investigated on MNF and Timberline properties in 2008. These surveys were not designed to document every CMS present within the action area, and due to the terrain, the behavior of CMS, and logistical constraints, it would not be possible to do so. It would also be extremely difficult to develop a monitoring plan that would be able to statistically quantify the reduction in numbers or reproduction being experienced. Therefore, for quantifiable forms of take, the anticipated level is expressed most accurately in terms of acres of CMS habitat affected.

The anticipated level of incidental take is summarized in Table 2. Habitat degradation is expected to occur on 8.2 acres. However, the implementation of conservation measures on 4.2 acres (3.3 acres on MNF properties and 0.90 acres on Timberline properties) currently affected by habitat degradation will reduce the level of anticipated take that will occur on those acres. Populations of CMS in the action area occupying a total of 41.4 acres will remain fragmented into three smaller subpopulations. Continued maintenance and use of the ski slope and trails in the action area will ensure that barriers to CMS migration remain. There is a discountable potential that these maintenance activities could result in direct crushing of individual CMS. The use of Snowmax® for snow making could decrease prey abundance for the CMS.

² Although the incidental take listed below includes the effects of the entire project, Timberline has not formally requested an exception from incidental take occurring on their private lands. Therefore, this BO currently only exempts the incidental take associated with those activities occurring on the MNF and does not include an exemption for activities on non-federal lands. Timberline may request, and the Service may grant, that this BO incorporate an exemption for the incidental take occurring on their private lands.

Table 3: Summary of Incidental Take (acres)		
<i>Habitat Degradation</i> (Cons. Meas. Applied)		
MNF property	3.3	(3.3)
Timberline property	4.9	(0.90)
Total	8.2	(4.2)
<i>Population Fragmentation</i>		
3 smaller subpopulations	21; 2.6; 17.8	
<i>Ski Slope/Trail Use & Maintenance</i>		
Cont. barrier to migration	Unquantifiable	
Direct Crushing	unquantifiable/discountable	
<i>Snowmax®</i>		
Reduction in prey availability	Unquantifiable	

However, implementation of the terms and conditions associated with the reasonable and prudent measures will reduce the potential for incidental take. If, during the course of the action, this level of incidental take is exceeded, such incidental take represents new information requiring reinitiation of consultation and review of the reasonable and prudent measures provided. The MNF must immediately provide an explanation of the causes of the taking and review with the Service the need for possible modification of the reasonable and prudent measures.

REASONABLE AND PRUDENT MEASURES

The Service believes the following reasonable and prudent measures (RPMs) are necessary and appropriate to minimize incidental take of CMS. In order to be exempt from the prohibitions of section 9 of the ESA, the MNF and Timberline must comply with the following terms and conditions which implement the RPMs and outline reporting/monitoring requirements. These terms and conditions are non-discretionary. Each RPM is listed in *italics*, followed by numbered terms and conditions that implement each RPM.

RPM 1: In order to restore more natural forest cover conditions the MNF/Timberline will purchase/obtain and plant additional red spruce throughout the wooded areas adjacent to the ski slope.

- 1.1 Approximately 200 trees will be planted within the areas identified as 2FSM and 2TLM on Figure 2. The MNF/Timberline will record or otherwise mark locations of planted trees so that they can be relocated for monitoring. (Note: This RPM has already been completed).
- 1.2 Survival and success of planted trees will be monitored annually, with a target of 75% survival for 3 years. If the target is not obtained, additional trees will be planted to replace trees lost through mortality. Once the target is met, trees will be monitored every other year to determine if any unusual mortality has occurred. If unusual conditions are

noted, remedial measures will be implemented based on consultation and concurrence between the Service and the MNF.

RPM 2: In order to increase downed woody debris that provides cover for CMS, the MNF/Timberline will purchase and install cover boards/slabs throughout the wooded areas adjacent to the ski slope.

- 2.1 Approximately 1200 cover boards/slabs will be placed throughout the areas identified as 2FSM and 2TLM on Figure 2. The MNF/Timberline will record or otherwise note general locations of cover boards so that they can be relocated for monitoring. (Note: This RPM has already been completed).
- 2.2 Use and condition of cover boards/slabs will be monitored annually. Additional cover boards will be installed if it is estimated that 33% of the cover boards/slabs are degraded or are otherwise unfunctional, unless after review of CMS monitoring results, and through consultation and concurrence between the Service and the MNF, it is determined that the replacement of cover boards is not necessary.

RPM 3: In order to increase the amount of leaf litter that retains soil moisture and provides increased food and cover for CMS, the MNF/Timberline will install and annually maintain leaf fences within and throughout occupied CMS habitat adjacent to the ski slope.

- 3.1 Location, lay-out, and materials/construction used for the fence will be designed to maximize retention of leaf litter within occupied CMS habitat and will be determined based on consultation between the Service, the MNF, Timberline, and CMS biologists. Placement of the fence may occur in areas identified as 1FSM, 2FSM, 2TL, and 2TLM on Figure 2. The fence will be installed within 30 days of SUP issuance. The MNF/Timberline will record or otherwise document (map/photograph) the installation of the fence, so that it can be located for monitoring.
- 3.2 The effectiveness and condition of the leaf fence will be monitored annually. Within 3 months of receiving the monitoring report, the MNF/Timberline will maintain, repair, or reposition the fence if monitoring suggests that this would increase the continued effectiveness/functioning of the structure. The fence may be removed if, after consultation and concurrence between the Service and the MNF, it is determined that its continued presence is not necessary.

RPM 4: In order to maintain soil moisture and chemistry conditions suitable to support the CMS, the MNF/Timberline will install, operate, and maintain a supplemental watering system in occupied CMS habitat adjacent to the ski slope.

- 4.1 Design and operation of the system, including triggers or threshold levels for initiating and terminating supplemental watering, will be cooperatively developed by Timberline, the MNF, the Service, and Dr. Pauley or other CMS biologist acceptable to the MNF and the Service. Placement of the system may occur in areas identified as 1FSM, 2FSM, 2TL, and 2TLM on Figure 2. The MNF/Timberline will install the watering system and

have it operational (including a completed operation plan with trigger/threshold levels) prior to June, 2009.

- 4.2 Prior to June of each year, the MNF/Timberline will inspect the watering system to ensure that it is operational and conduct any required maintenance or repairs to the system. The MNF/Timberline will continue to operate the watering system according to the approved operational plan until, after consultation and concurrence between the Service and the MNF, it is determined that its continued operation is not necessary.
- 4.3 In order to ensure that project operations are not making soil chemistry conditions unsuitable to support the CMS, a soil monitoring plan shall be developed through consultation and concurrence between the MNF and the Service. Monitoring of surface soil chemistry (O, A, and E or top of B layers) will be conducted annually at 3-5 sites within the affected area and will include analysis of soil pH, base cation concentration, cation exchange capacity, and base saturation.

RPM 5: In order to ensure that the conservation measures are effective and that the level of incidental take is not exceeded, CMS population and habitat monitoring will be conducted annually.

- 5.1 Annual monitoring shall be conducted consistent with procedures previously established and implemented (citation) and shall also include monitoring of planted trees, cover boards, etc., as described in Terms and Conditions 1.2; 2.2; 3.2; 4.2; and 4.3 above. CMS population monitoring will be conducted by a biologist agreed upon by the Service and the MNF, and who has a valid State Collecting Permit from the West Virginia Division of Natural Resources. Monitoring of fences, soils, and other similar minimization measures may be conducted by the biologist conducting the population monitoring, other consultants, or staff of the MNF/Timberline that have appropriate expertise and/or experience.
- 5.2 A report of the previous year's monitoring results shall be prepared and submitted to the Service, the MNF, and Timberline prior to June 30 of each following year. The first report shall be provided by June 30, 2009.
- 5.3 The MNF, Service, and Timberline in consultation, shall annually review the monitoring report and determine whether the conservation and minimization measures as described in the RPMs should be modified, discontinued, or supplemented.

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the ESA directs federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information. The measures proposed below would further meet the conservation needs of the species as described in the Status of the Species section above, and

would be consistent with the Recovery Actions identified in the CMS Recovery Plan and/or the goals of the Forest Plan as they relate to the CMS. The Service recommends the following:

1. Conduct presence/absence surveys of CMS populations on Timberline properties (areas 1TLM, 2TLM, 1TLA, and 1Tlb) every other year to ensure that they are still present. This would implement Recovery Action 1.3 (Periodically survey all known populations) in the CMS Recovery Plan.
2. Plant additional red spruce trees in the area just south of the ski lift and adjacent to the trail in area 1TLA. This area appears to be adversely affected by increased winds and loss of canopy cover resulting in decreased soil moisture which is reducing habitat suitability for the CMS. This would implement CMS Recovery Plan Action 2.4 (Protect occupied habitats and CMS populations on private lands), and Forest Plan Goal TE04 (Within watershed-level planning units, identify TEP species habitat and opportunities to maintain, restore, or enhance habitat conditions).
3. Due to the presence of existing ski slopes, ski lifts and other features, opportunities to reduce fragmentation of CMS populations that occur on MNF and Timberline properties are limited. However, an additional CMS population exists to the south of area 1TLA on property owned by CVNWR. This population is currently fragmented from populations on Timberline properties due to the presence of a small area unsuitable habitat, and from other populations on MNF lands by unsuitable or marginal habitat in area 1FSa and 1FS. Timberline, CVNWR, and the MNF could initiate cooperative habitat restoration efforts such as planting additional red spruce and placing downed woody debris in the area between the populations that would result in connecting these population fragments. This would implement CMS Recovery Plan Actions 5.2 (Implement a long-term management program); 2.4 (Protect occupied habitats and CMS populations on private lands); and 2.3 (Protect occupied habitats and CMS populations on public lands), and Forest Plan Goal TE57 (Identify opportunities to reduce fragmentation of CMS populations and habitat).
4. Because the area in and around the Salamander Run ski slope is used by a large number of visitors that are engaging in a variety of recreational pursuits, Timberline and the MNF have a unique opportunity to educate users about the importance of the red spruce ecosystem and the CMS. Timberline, the MNF, and the Service could cooperatively develop, distribute, and install interpretative signs, brochures, or programs that would address this issue. It would also reduce the potential that these visitors would inadvertently engage in additional activities that might adversely affect the CMS (e.g. creating new, unauthorized trails, clearing trees, or removing leaf fences, cover boards or other previously installed minimization measures). This would implement CMS Recovery Plan Action 6.2 (Release educational information to the general public) and Forest Plan Goal TE05 (Collaborate on outreach programs for TEP species and their conservation needs).
5. Timberline should consider providing long-term preservation in areas identified as occupied CMS habitat (2TL, 2TLM, 1TLA, 1Tlb) by placing them under conservation easement or other management agreement with a conservation organization. This would

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implement CMS Recovery Plan Action 2.41 (Develop cooperative agreements with private landowners). Timberline should also avoid activities in these areas that could cause additional adverse effects to CMS such as constructing new trails, lifts, or structures; clearing trees or initiating ground disturbing activities. Timberline should be aware that engaging in these types of activities could result in unauthorized take and violations under section 9 of the ESA, unless appropriate coordination and consultation with the Service is completed prior to initiating any activities.

In order for the Service to be kept informed of actions minimizing or avoiding adverse effects or benefiting listed species or their habitats, the Service requests notification of the implementation of any conservation recommendations.

REINITIATION NOTICE

This concludes formal consultation for the MNF's proposed issuance of a SUP for Timberline. No further section 7 consultation will be necessary except if any reinitiation criteria are met. As required by 50 CFR 402.16, reinitiation of formal consultation is required where discretionary federal agency involvement or control over the action has been retained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; (3) the action is subsequently modified in a manner that causes an effect to the listed species or critical habitat not considered in this opinion; or (4) a new species is listed or critical habitat is designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any operations causing such a take must cease, pending reinitiation.

The Service appreciates the opportunity to work with the MNF and Timberline in fulfilling our mutual responsibilities under the Endangered Species Act. If you have any questions regarding this letter, please contact Ms. Barbara Douglas of my staff at (304) 636-6586 ext. 19, or at the letterhead address.

Sincerely,



Laura Hill
Acting Field Supervisor

Enclosures (2)

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March 10, 2009

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cc:

MNF – John Calabrese, Acting District Ranger Cheat/Potomac District

Dan Arling - SO

WVDNR – Stihler

Dr. Pauley

Timberline – Blanzky

Project File

Reader File

ES:WVFO:BDouglas:skd:3/10/2009

Filename: P:\Finalized Correspondence\US Forest Service\Timberline\Timberline BO Final.doc

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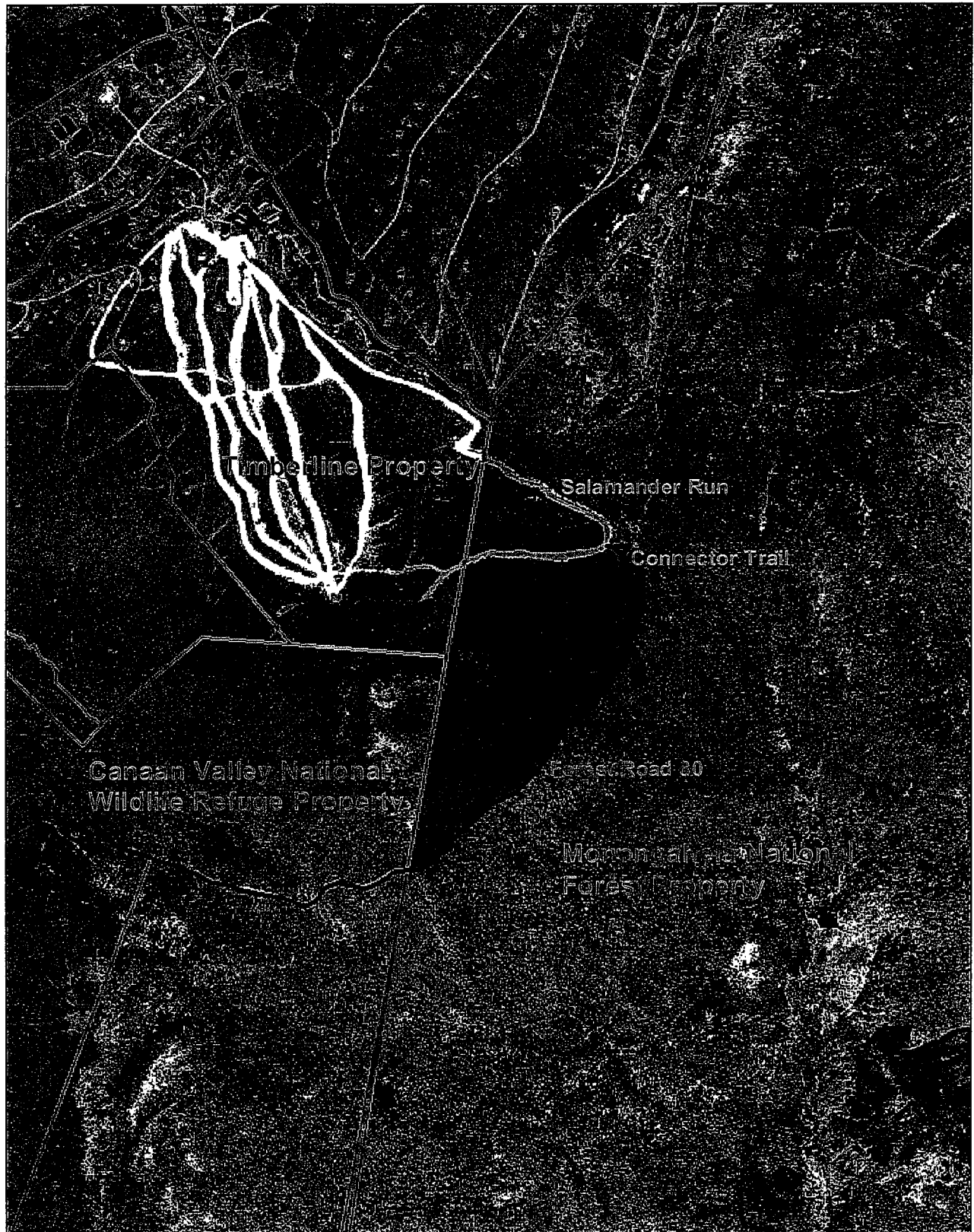
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Figure 1: Action Area for the Timberline SUP



Action Area is highlighted in 

Property Boundaries are 



This is an aerial map showing the Canaan Valley National Wildlife Refuge and its surroundings. The refuge is outlined in white and labeled 'Canaan Valley National Wildlife Refuge Property'. To the north is the 'Medenwald National Forest Property' and to the west is the 'Timberline Property'. A winding stream, 'Salamander Run', flows from the northwest towards the center. A 'Connector Trail' is marked with an arrow pointing east. 'Forest Road 80' is visible in the lower right. The map includes labels for 'BLM' (Bureau of Land Management) and 'USFS' (United States Forest Service). A large, faint 'K' is visible in the bottom right corner.